

December 12, 2006

A Comparison of Judge Jones' Opinion in *Kitzmiller v. Dover* with Plaintiffs' Proposed "Findings of Fact and Conclusions of Law"

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Executive Summary

In December of 2005, critics of the theory of intelligent design (ID) hailed federal judge John E. Jones' ruling in *Kitzmiller v. Dover*, which declared unconstitutional the reading of a statement about intelligent design in public school science classrooms in Dover, Pennsylvania. Since the decision was issued, Jones' 139-page judicial opinion has been lavished with praise as a "masterful decision" based on careful and independent analysis of the evidence. However, a new analysis of the text of the *Kitzmiller* decision reveals that nearly all of Judge Jones' lengthy examination of "whether ID is science" came not from his own efforts or analysis but from wording supplied by ACLU attorneys. **In fact, 90.9% (or 5,458 words) of Judge Jones' 6,004-word section on intelligent design as science was taken virtually verbatim from the ACLU's proposed "Findings of Fact and Conclusions of Law" submitted to Judge Jones nearly a month before his ruling.** Judge Jones even copied several clearly erroneous factual claims made by the ACLU. The finding that most of Judge Jones' analysis of intelligent design was apparently not the product of his own original deliberative activity seriously undercuts the credibility of Judge Jones' examination of the scientific validity of intelligent design.

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In December of 2005, defenders of Darwinian evolution hailed federal judge John E. Jones' ruling in *Kitzmiller v. Dover*,[1] which declared unconstitutional the reading of a statement about intelligent design (ID) in public school science classrooms in Dover, Pennsylvania. Since the decision was issued, Jones' 139-page judicial opinion has been lavished with praise as a "masterful decision" based on careful and independent analysis of the evidence:

- According to University of Chicago geophysicist Raymond Pierrehumbert, Jones' ruling is a "masterpiece of wit, scholarship and clear thinking."[2]
- According to pro-Darwin lawyer Ed Darrell, "Jones wrote a masterful decision, a model for law students on how to decide a case based on the evidence presented." Indeed, Jones' ruling is "a model of law... a model of argument... a model of legal philosophy... [and] a model of integrity of our judicial system."[3]
- According to *Scientific American's* editor John Rennie, Jones' opinion constitutes "an encyclopedic refutation of I.D."[4]
- According to plaintiffs' expert witness, Southeastern Louisiana University philosopher Barbara Forrest, Judge Jones' ruling is "a marvel of clarity and forthrightness."[5]
- According to *Time* magazine, the ruling made Jones one of "the world's most influential people" in the category of "scientists and thinkers."[6]
- According to bloggers at the pro-Darwin *Panda's Thumb* website, Jones' decision is an important work "of both scholarship and history,"[7] and Jones himself is "a top-notch thinker,"[8] "an outstanding thinker,"[9] someone who "is as deserving of the title 'great thinker' as someone who writes a great mathematical proof or a great work of music criticism."[10]

The underlying theme in these comments is that Judge Jones should be recognized for his lucid analysis and mastery of the factual record, especially when it comes to his determination that intelligent design is not science.

However, a new analysis of the text of the *Kitzmiller* decision seriously undercuts the idea that Judge Jones' decision was "a masterpiece… of scholarship" produced by "an outstanding thinker." It reveals that nearly all of Judge Jones' lengthy examination of "whether ID is science" came not from his own efforts or analysis but from wording written for him by ACLU attorneys.

In fact, 90.9% (or 5,458 words) of Judge Jones' 6,004-word section on intelligent design as science was taken verbatim or virtually verbatim from the proposed "Findings of Fact and Conclusions of Law" submitted to Judge Jones by ACLU attorneys nearly a month before his ruling.[11] Jones essentially cut-and-pasted the ACLU's wording into his ruling to come up with his decision. (For examples of Judge Jones' use of the ACLU's wording, see *Table A*. For a paragraph-by-paragraph comparison of Jones' language with the language in the ACLU's proposed "Findings of Fact," see *Table D.)*

Judge Jones' extensive borrowing from the ACLU did not end with the words of ACLU lawyers. He even borrowed the overall structure of his analysis of intelligent design from the

ACLU. The ACLU organized its critique of ID around six main claims, and Judge Jones adopted an identical outline, discussing the same claims in precisely the same sequence. (For a comparison between the structure of Jones' critique of ID and the ACLU's critique, see *Table B*.)

In addition, Judge Jones appears to have copied the ACLU's work uncritically. As a result, his judicial opinion perpetuated several egregious factual errors originally found in the ACLU's proposed "Findings of Fact." For example:

- Judge Jones claimed that biochemist Michael Behe, when confronted with articles supposedly explaining the evolution of the immune system, replied that these articles were "not 'good enough.'"[12] **In reality, Behe said the exact opposite at trial: "it's *not* that they aren't good enough. It's simply that they are addressed to a different subject."*[13]*** (emphasis added) The answer cited by Judge Jones came not from Behe, but from the ACLU's proposed "Findings of Fact," which misquoted Behe, twisting the substance of his answer.[14]

- Judge Jones claimed that "ID is not supported by **any** peer-reviewed research, data or publications."[15] (emphasis added) Again, the actual court record shows otherwise. University of Idaho microbiologist Scott Minnich testified at trial that there are between "seven and ten" peer-reviewed papers supporting ID,[16] and he specifically discussed[17] Stephen Meyer's explicitly pro-intelligent design article[18] in the peer-reviewed biology journal, *Proceedings of the Biological Society of Washington*. Additional peer-reviewed publications, including William Dembski's peer-reviewed monograph, *The Design Inference* (published by Cambridge University Press),[19] were described in an annotated bibliography of peer-reviewed and peer-edited publications supporting ID submitted in an *amicus brief* accepted as part of the official record of the case by Judge Jones.[20] Judge Jones' false assertions about peer-reviewed publications simply copied the ACLU's erroneous language in its proposed "Findings of Fact."[21]

- Judge Jones insisted that ID "requires supernatural creation,"[22] that "ID is predicated on supernatural causation,"[23] and that "ID posits that animals… were created abruptly by a … supernatural, designer."[24] He further claimed that "[d]efendants' own expert witnesses acknowledged this point."[25] ***In fact, defendants' expert witnesses did nothing of the sort.*** This allegation was yet another erroneous finding copied by Judge Jones from the ACLU's proposed "Findings of Fact." Contrary to the ACLU, ID proponents—***including the defendants' expert witnesses at the* Kitzmiller *trial***—have consistently explained that ID as a scientific theory does ***not*** require a supernatural designer. For example, when asked at trial "whether intelligent design requires the action of a supernatural creator," biochemist Scott Minnich replied, "It does not."[26]

(For a list of false statements Judge Jones adopted from the ACLU, see *Table C*.)

Proposed "findings of fact" are prepared to assist judges in writing their opinions, and judges are certainly allowed to draw on them. Indeed, judges routinely invite lawyers to propose findings of fact in order to verify what the lawyers believe to be the key factual issues in the case. Thus, in legal circles Judge Jones' use of the ACLU's proposed "Findings of Fact and Conclusions of Law" would not be considered "plagiarism" nor a violation of judicial ethics.

Nonetheless, the extent to which Judge Jones simply copied the language submitted to him by the ACLU is stunning. For all practical purposes, Jones allowed ACLU attorneys to write nearly the entire section of his opinion analyzing whether intelligent design is science. As a result, this central part of Judge Jones' ruling reflected essentially no original deliberative activity or independent examination of the record on Jones' part. The revelation that Judge Jones in effect "dragged and dropped" large sections of the ACLU's "Findings of Fact" into his opinion, errors and all, calls into serious question whether Jones exercised the kind of independent analysis that would make his "broad, stinging rebuke"[27] of intelligent design appropriate.

We and others already have criticized Jones' effort to decide the scientific status of intelligent design as a needless and inappropriate exercise of judicial power.[28] As we explain in a forthcoming law review article, when Judge Jones described the breadth of his opinion as being the result of a "fervent hope" that it "could serve as a primer for school boards and other people who were considering this [issue],"[29] he admitted (apparently without realizing it) that he was a judicial activist.[30] Even Boston University law professor Jay Wexler, who opposes ID, concurs that "[t]he part of Kitzmiller that finds ID not to be science is unnecessary, unconvincing, not particularly suited to the judicial role, and even perhaps dangerous to both science and freedom of religion."[31] The new disclosure that Judge Jones' analysis of the scientific status of ID merely copied language written for him by ACLU attorneys underscores just how inappropriate this part of *Kitzmiller* was—and why Judge Jones' analysis should not be regarded as the final word about intelligent design.

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[1] *Kitzmiller et. al. v. Dover Area School Board*, No. 04cv2688, 2005 WL 345563 (M. D. Pa. Dec. 20, 2005). The slip version of the opinion can be found at the district court's website here, http://www.pamd.uscourts.gov/kitzmiller/kitzmiller_342.pdf (accessed Nov. 25, 2006).

[2] "Happy Birthday, Charles Darwin," February 16, 2006, http://www.realclimate.org/index.php/archives/2006/02/happy-birthday-charles-darwin/ (accessed Nov. 25, 2006).

[3] "...in which I defend the judiciary against barbaric assault," http://timpanogos.wordpress.com/2006/08/14/in-which-i-defend-the-judiciary-against-barbaric-assault/ (posted August 14, 2006; accessed Nov. 25, 2006).

[4] John Rennie, "Threw the Book at 'Em," http://blog.sciam.com/index.php?title=threw_the_book_at_em&more=1&c=1&tb=1&pb=1 (posted Dec. 20, 2005; accessed Nov. 25, 2006).

[5] Barbara Forrest, "The 'Vise Strategy' Undone: Kitzmiller et al. v. Dover Area School District," http://www.csicop.org/intelligentdesignwatch/kitzmiller.html (accessed Nov. 27, 2006).

[6] Matt Ridley, "John Jones: The Judge Who Ruled for Darwin," http://www.time.com/time/magazine/article/0,9171,1187265,00.html (May 6, 2006 issue; accessed Nov. 25, 2006).

[7] "I think the kitzmiller trial documents and decision are important as works of both scholarship and history." (Comment by Andrew McClure, May 3, 2006, http://www.pandasthumb.org/archives/2006/05/judge_jones_mak.html - comment-99857, accessed Nov. 25, 2006).

[8] "...Jones came into the case with (apparently) only superficial knowledge of the issues at hand, and was able to absorb and assess them all very well. that makes him seem like a top-notch thinker to me." (Comment by Mike Z, May 3, 2006, http://www.pandasthumb.org/archives/2006/05/judge_jones_mak.html - comment-99873, accessed Nov. 25, 2006).

[9] "...when Judge Jones demonstrated clear thinking in abundance in his writing of a decision that seems to have put the ID movement on the run, much as Gen. Jackson's forces did to the British at the Battle of New Orleans, it qualifies him as an outstanding thinker." (Comment by Ed Darrell, May 3, 2006, http://www.pandasthumb.org/archives/2006/05/judge_jones_mak.html - comment-99863, accessed Nov. 25, 2006).

[10] Comment by Andrew McClure, *supra*, note 7.

[11] This percentage was calculated by using MS Word's "Word Count" function to determine the word count for all of the sections of the *Kitzmiller* decision that were taken verbatim or nearly verbatim from the ACLU's proposed "Findings of Fact and Conclusions of Law." The resulting number (5,458) was then divided by the total number of words in the section on "Whether ID is science" (6,004; this number was also determined by MS Word's "Word Count" function).

[12] *Kitzmiller v. Dover*, 400 F.Supp.2d. 707, 741 (M.D. Pa. 2005).

[13] Michael Behe, Testimony Transcript 19 (*Kitzmiller v. Dover*, afternoon session, Oct. 19, 2005).

[14] Plaintiffs' Findings Fact and Conclusions of Law 35 (*Kitzmiller v. Dover*).

[15] *Kitzmiller*, 400 F.Supp.2d. at 741.

[16] Scott Minnich, Testimony Transcript 34 (*Kitzmiller v. Dover*, morning session, Nov. 4, 2005).

[17] *Ibid.*

[18] Stephen Meyer, "The Origin of Biological Information and the Higher Taxonomic Categories" *Proceedings of the Biological Society of Washington* 117(2004):213-239, at http://www.discovery.org/scripts/viewDB/index.php?command=view&id=2177&program=CSC - Scientific Research and Scholarship - Science.

[19] William A. Dembski, *The Design Inference: Eliminating Chance Through Small Probabilities* 62 (Cambridge University Press 1998).

[20] Brief of Amicus Curiae Foundation for Thought and Ethics, at appendix D 8-18, at http://www.discovery.org/scripts/viewDB/filesDB-download.php?command=download&id=648 (accessed Nov. 27, 2006).

[21] Plaintiffs' Findings Fact and Conclusions of Law 51 (*Kitzmiller v. Dover*).

[22] *Kitzmiller*, 400 F.Supp.2d. at 721.

[23] *Ibid.* at 736.

[24] *Ibid.*

[25] *Ibid.*

[26] Scott Minnich, Testimony Transcript 45-46 (*Kitzmiller v. Dover*, afternoon session, Nov. 3, 2005). *See also* Michael Behe, Testimony Transcript 86 (*Kitzmiller v. Dover*, morning session, Oct. 17, 2005).

[27] Laurie Goodstein, "Issuing Rebuke, Judge Rejects Teaching of Intelligent Design," *The New York Times,* December 21, 2005, A1.

[28] See David K. DeWolf, John West, Casey Luskin, "Intelligent Design Will Survive *Kitzmiller v. Dover*," *Montana Law Review* (forthcoming 2007). See also David DeWolf, John West, Casey Luskin, and Jonathan Witt, *Traipsing into Evolution: Intelligent Design and the Kitzmiller vs. Dover Decision* 7-14, 25-28 (Seattle: Discovery Institute Press, 2006).

[29] Lisa L. Granite, *One for the History Books*, 28-Aug PA. LAW. 17, 22 (2006).

[30] "[P]olicymaking is inherent in the work of the courts, but judges have some control over the extent of their involvement in policymaking. In deciding cases, judges often face a choice between alternatives that would enhance their court's role in policymaking and those that would limit its role. ...When judges choose to increase their impact as policymakers, they can be said to engage in activism; choices to limit that impact can be labeled judicial restraint." Lawrence Baum, *American Courts: Process And Policy* 316 (4th ed. Houghton Mifflin Company, 1998). This point will be discussed in David K. DeWolf, John West, Casey Luskin, "Intelligent Design Will Survive *Kitzmiller v. Dover*," *Montana Law Review* (forthcoming 2007).

[31] Jay Wexler, Abstract, *Judging Intelligent Design: Should the Courts Decide What Counts as Science or Religion?*, The Boisi Center for Religion & American Public Life at Boston College (Sept. 28, 2006) http://www.bc.edu/bc_org/research/rapl/events/abstract_wexler.html (accessed Sept. 25, 2006). Wexler opposes intelligent design and supports the result of the *Kitzmiller* case, which makes his criticism of Judge Jones' venture into the scientific status of intelligent design all the more noteworthy.

Table A

Examples of Judge Jones' Borrowing from ACLU

Judge Jones' Decision	ACLU's Proposed "Findings of Fact"
It is notable that defense experts' own mission, which mirrors that of the IDM itself, is to change the ground rules of science to allow supernatural causation of the natural world...	Indeed, defendants' argument, which mirrors that of the intelligent-design movement, is to change the ground rules of science to allow supernatural causation of the natural world.
ID is at bottom premised upon a false dichotomy, namely, that to the extent evolutionary theory is discredited, ID is confirmed… We do not find this false dichotomy any more availing to justify ID today than it was to justify creation science two decades ago.	Intelligent design is premised on a false dichotomy, namely, that to the extent evolutionary theory is discredited, intelligent design is confirmed.… This argument is no more availing to justify intelligent design today than it was to justify creation science two decades ago.
ID proponents primarily argue for design through negative arguments against evolution, as illustrated by Professor Behe's argument that "irreducibly complex" systems cannot be produced through Darwinian, or any natural, mechanisms.	Intelligent design proponents primarily argue for design through negative argument against evolution, including Professor Behe' s argument that "irreducibly complex" systems cannot be produced through Darwinian, or any natural, mechanisms.
… just because scientists cannot explain every evolutionary detail does not undermine its validity as a scientific theory as no theory in science is fully understood.	Just because scientists cannot explain every evolutionary detail does not undermine its validity as a scientific theory. No theory in science is fully understood.
We find that such evidence demonstrates that the ID argument is dependent upon setting a scientifically unreasonable burden of proof for the theory of evolution.	This evidence demonstrates that the intelligent design argument depends on setting a burden of proof for the theory of evolution that is scientifically unreasonable.
…the only attribute of design that biological systems appear to share with human artifacts is their complex appearance, i.e. if it looks complex or designed, it must have been designed…. This inference to design based upon the appearance of a "purposeful arrangement of parts" is a completely subjective proposition, determined in the eye of each beholder….	Ultimately, the only attribute of design that biological systems share with human artifacts is their complex appearance -- if it looks complex or designed, it must have been designed…. This inference to design based on the appearance of a "purposeful arrangement of parts" is a completely subjective proposition, determined in the eye of each beholder.
Before discussing Defendants' claims about evolution, we initially note that an overwhelming number of scientists, as reflected by every scientific association that has spoken on the matter, have rejected the ID proponents' challenge to evolution.	Before discussing defendants' claims about evolution in greater detail, it must be noted that the overwhelming number of scientists, as reflected by every scientific association that has spoken to the matter, have rejected intelligent- design proponents' challenge to evolution….

Table B

A Comparison of the Structure of Judge Jones' Critique of ID and the ACLU's Critique of ID

Judge Jones' Decision	ACLU's Proposed "Findings of Fact"
… ID is not science. We find that ID fails on three different levels, any one of which is sufficient to preclude a determination that ID is science. They are: (1) ID violates the centuries-old ground rules of science by invoking and permitting supernatural causation; (2) the argument of irreducible complexity, central to ID, employs the same flawed and illogical contrived dualism that doomed creation science in the 1980's; and (3) ID's negative attacks on evolution have been refuted by the scientific community. As we will discuss in more detail below, it is additionally important to note that ID has failed to gain acceptance in the scientific community, it has not generated peer-reviewed publications, nor has it been the subject of testing and research.	Intelligent design is not science. It fails on three distinct levels, anyone of which invalidates the proposition: a) by invoking and permitting supernatural causation, intelligent design violates the centuries-old ground rules of science; b) intelligent design, including it's poster child argument, irreducible complexity, employs the same flawed and illogical, contrived dualism that doomed creation science in the 1980's; and c) intelligent design's negative attacks on evolution have been refuted by the scientific community. Furthermore, intelligent design has failed to gain acceptance in the scientific community, generate peer-reviewed publications, or been the subject of testing and research.

Table C
Selected Examples of ACLU Errors Perpetuated by Judge Jones

Judge Jones' Decision	ACLU's Proposed "Findings of Fact"	Trial Record
He [Behe] was presented with fifty-eight peer-reviewed publications, nine books, and several immunology textbook chapters about the evolution of the immune system; however, he simply insisted that this was still not sufficient evidence of evolution, and that it was not "good enough."	He [Behe] was confronted with the fifty-eight peer-reviewed publications, nine books and several immunology text-book chapters about the evolution of the immune system, P256, 280, 281, 283, 747, 748, 755 and 743, and he insisted that this was still not sufficient evidence of evolution - it was "not good enough.	***Behe's real testimony:*** These articles are excellent articles I assume. **However, they do not address the question that I am posing. So it's not that they aren't good enough.** It's simply that they are addressed to a different subject.[1]
...ID is not supported by any peer-reviewed research, data or publications.	Intelligent design is not supported by any peer-reviewed research, data or publications.	Expert witness Scott Minnich testified at trial that there were between "seven and ten" peer-reviewed papers supporting ID,[2] and he discussed a pro-intelligent design article in the peer-reviewed biology journal, *Proceedings of the Biological Society of Washington*.[3] Additional peer-reviewed publications were listed in an annotated bibliography submitted in an *amicus brief* accepted as part of the official court record by Judge Jones.[4]
In addition to failing to produce papers in peer-reviewed journals, ID also features no scientific research or testing.	Besides failing to produce papers in peer-reviewed journals, intelligent design also features no scientific research or testing.	Microbiologist Scott Minnich testified in court showing slides of the genetic knock-out experiments he performed in his own laboratory at the University of Idaho which found that the bacterial flagellum is irreducibly complex with respect to its complement of 35 genes.[5] Judge Jones failed to mention any of Minnich's experimental data supporting the irreducible complexity of the flagellum.
ID is predicated on supernatural causation... ID takes a natural phenomenon and, instead of accepting or seeking a natural explanation, argues that the explanation is supernatural.	Intelligent design is predicated on supernatural causation... Intelligent design takes a natural phenomenon and, instead of accepting or seeking a natural explanation, argues that the explanation is supernatural.	Both Michael Behe and Scott Minnich testified otherwise at trial,[6] and the court accepted an *amicus brief* providing detailed documentation of the view of intelligent design proponents that intelligent design is *not* predicated on supernatural causation.[7]

Further support for the conclusion that ID is predicated on supernatural causation is found in the ID reference book to which ninth grade biology students are directed, *Pandas. Pandas* states, in pertinent part, as follows: Darwinists object to the view of intelligent design *because it does not give a natural cause explanation* of how the various forms of life started in the first place. Intelligent design means that various forms of life began abruptly, through an intelligent agency, with their distinctive features already intact--fish with fins and scales, birds with feathers, beaks, and wings, etc. P-11 at 99-100 (emphasis added). Stated another way, ID posits that animals did not evolve naturally through evolutionary means but were created abruptly by a non-natural, or supernatural, designer.	The intelligent-design reference book cited in the Dover statement as describing "what intelligent design actually involves," *Of Pandas and People,* is clear that the idea entails supernatural causation: "Darwinists object to the view of intelligent design *because it does not give a natural cause explanation* of how the various forms of life started in the first place. Intelligent design means that various forms of life began abruptly, through an intelligent agency, with their distinctive feature already intact - fish with fins and scales, birds with feathers, beaks, and wings, etc." Pll, at 99-100. (Emphasis added). In other words, animals did not evolve naturally, through evolutionary means, but rather were created abruptly by a non-natural, or supernatural, designer.	Contrary to the claim made by Judge Jones (and the ACLU), *Of Pandas and People* insists that science ***cannot*** detect the "supernatural." It can merely determine whether a cause is intelligent. Whether that intelligent cause is inside or outside of nature is a question that cannot be addressed by science according to the book. These points are made clear in the following passages from the text ignored by Judge Jones: ...scientists from within Western culture failed to distinguish between ***intelligence, which can be recognized by uniform sensory experience, and the supernatural,*** **which cannot**. Today, we recognize that appeals to intelligent design may be considered in science, as illustrated by the current NASA search for extraterrestrial intelligence (SETI)... Archaeology has pioneered the development of methods for distinguishing the effects of natural and intelligent causes. ***We should recognize, however, that if we go further, and conclude that the intelligence responsible for biological origins is outside the universe (supernatural) or within it, we do so without the help of science.***[8] (emphasis added) The idea that life had an intelligent source is hardly unique to Christian fundamentalism. Advocates of design have included not only Christians and other religious theists, but pantheists, Greek and Enlightenment philosophers and now include many modern scientists who describe themselves as religiously agnostic. Moreover, the concept of design implies absolutely nothing about beliefs and normally associated with Christian fundamentalism, such as a young earth, a global flood, or even the existence of the Christian God. ***All it implies is that life had an intelligent source***.[9] (emphasis added)

Defendants' own expert witnesses acknowledged this point ["that animals did not evolve naturally through evolutionary means but were created abruptly by a non-natural, or supernatural, designer"].	Even defendants' own expert witnesses acknowledged this point [that "animals did not evolve naturally, through evolutionary means, but rather were created abruptly by a non-natural, or supernatural, designer"].	Again, this misrepresents the court record. Consider the testimony of Scott Minnich: Q. Do you have an opinion as to whether intelligent design requires the action of a supernatural creator? A. I do. Q. What is that opinion? A. It does not.[10]
Professor Behe excludes, by definition, the possibility that a precursor to the bacterial flagellum functioned not as a rotary motor, but in some other way, for example as a secretory system. (19:88-95 (Behe)).	He [Behe] excludes, by definition, the possibility that a precursor functioned in some other way - for example, in the case of the bacterial flagellum, as a secretory system. 19:88-95.	This claim is manifestly false. In the citation supplied by Judge Jones (copied directly from the ACLU), Behe does *not* exclude the possibility of a "precursor [that] functioned in some other way." In fact, Behe *never* claimed that subsystems of irreducibly complex systems could not have some other function. Rather, in this session, Behe specifically acknowledged that exaptation can occur, but that it does not rule out intelligent design because exaptation via random mutation and natural selection is highly improbable: Q. You say, Even if a system is irreducibly complex and thus could not have been produced directly, however, one cannot definitively rule out the possibility of an indirect, circuitous route, right? A. Yes. Q. And by indirect, you mean evolution from a pre-cursor with a different function than the system being studied? A. Yes, different function, perhaps different number of parts, and so on. Q. And one example of that is what's discussed in, among evolutionary biologists, as the concept of exaptation, correct? A. Yeah -- well, before I say, yes, I'd just like to say, the word exaptation is oftentimes used in loose sense, but, yes, that's generally correct. Q. And that is a concept that people in the field of evolutionary biology consider to be a valid concept, a valid description of the way more and more complex systems get developed? ... A. Again, let me make clear what we're talking about here. Some evolutionary biologists certainly think that exaptation is real and that it's important and so on.

		But simply saying that this part over here was exapted from that part over here does not give an explanation of how random mutation and natural selection could have gotten it from one state to the other. Q. But it is certainly, exaptation -- for example, a bird wing developing from some kind of feathered structure on a dinosaur that didn't necessarily allow flight, that's what evolutionary biologists propose, and they call it exaptation? A. That's entirely possible, and that's consistent with intelligent design, because intelligent design only focuses on the mechanism of how such a thing would happen. So the critical point for my argument is, how such things could develop by random mutation and natural selection... Q. Okay. Now you go on in this passage and say, As the complexity of an interacting system increases, though, the likelihood of such an indirect route drops precipitously, and as the number of unexplained irreducibly complex biological systems increases, our confidence that Darwinian's criterion of failure has been met and skyrockets toward the maximum that science allows? What you're saying there is, you know, it could happen, I'm not ruling it out, but it's really improbable? A. Yes, it's improbable.[11] This testimony is consistent with Behe's arguments in *Darwin's Black Box*, which was admitted into the evidentiary record, and which acknowledges the possibility of indirect routes of evolution but explains why they do not refute irreducible complexity.[12] It should be noted that Scott Minnich also addressed why irreducible complexity is not refuted simply because the Type Three Secretory System could function as a subsystem.[13] Judge Jones completely ignored Minnich's testimony despite the fact that it directly rebutted the plaintiffs' claims.

Table D

Paragraph by Paragraph Comparison Between Judge Jones' Opinion and Plaintiffs' Proposed "Findings of Fact and Conclusions of Law"

KITZMILLER v. DOVER **MEMORANDUM OPINION** Each paragraph has been separated. The periodic insertion of page numbers preceded by asterisks (e.g., ***737**) indicates the page number in the *Kitzmille*r opinion, as it appeared in the Federal Supplement (2d). The full opinion is available at the Court's official website: http://www.pamd.uscourts.gov/kitzmiller/kitzmiller_342.pdf This comparison is limited to the section that has implications beyond the Dover School Board—the aspect of the opinion that Judge Jones hoped would "prevent the obvious waste of judicial and other resources which would be occasioned by a subsequent trial involving the precise question which is before us." (400 F.Supp.2d at 735).	**PLAINTIFFS' FINDINGS OF FACT AND CONCLUSIONS OF LAW** http://www.discovery.org/scripts/viewDB/filesDB-download.php?command=download&id=1184 (Numbers at the beginning of a paragraph indicate the number of the Proposed Finding of Fact)
4. *Whether ID is Science* After a searching review of the record and applicable caselaw, we find that while ID arguments may be true, a proposition on which the Court takes no position, ID is not science. We find that ID fails on three different levels, any one of which is sufficient to preclude a determination that ID is science. They are: (1) ID violates the centuries-old ground rules of science by invoking and permitting supernatural causation; (2) the argument of irreducible complexity, central to ID, employs the same flawed and illogical contrived dualism that doomed creation science in the 1980's; and (3) ID's negative attacks on evolution have been refuted by the scientific community. As we will discuss in more detail below, it is additionally important to note that ID has failed to gain acceptance in the scientific community, it has not generated peer-reviewed publications, nor has it been the subject of testing and research.	33. Intelligent design is not science. It fails on three distinct levels, anyone of which invalidates the proposition: a) by invoking and permitting supernatural causation, intelligent design violates the centuries-old ground rules of science; b) intelligent design, including it's poster child argument, irreducible complexity, employs the same flawed and illogical, contrived dualism that doomed creation science in the 1980's; and c) intelligent design's negative attacks on evolution have been refuted by the scientific community. Furthermore, intelligent design has failed to gain acceptance in the scientific community, generate peer-reviewed publications, or been the subject of testing and research.

Expert testimony reveals that since the scientific revolution of the 16th and 17th centuries, science has been limited to the search for natural causes to explain natural phenomena. (9:19-22 (Haught); 5:25-29 (Pennock); 1:62 (Miller)). This revolution entailed the rejection of the appeal to authority, and by extension, revelation, in favor of empirical evidence. (5:28 (Pennock)). Since that time period, science has been a discipline in which testability, rather than any ecclesiastical authority or philosophical coherence, has been the measure of a scientific idea's worth. (9:21-22 (Haught); 1:63 (Miller)). In deliberately omitting theological or "ultimate" explanations for the existence or characteristics of the natural world, science does not consider issues of "meaning" and "purpose" in the world. (9:21 (Haught); 1:64, 87 (Miller)). While supernatural explanations may be important and have merit, they are not part of science. (3:103 (Miller); 9:19-20 (Haught)). This self-imposed convention of science, which limits inquiry to testable, natural explanations about the natural world, is referred to by philosophers as "methodological naturalism" and is sometimes known as the scientific method. (5:23, 29-30 (Pennock)). Methodological naturalism is a "ground rule" of science today which requires scientists to seek explanations in the world around us based upon what we can observe, test, replicate, and verify. (1:59-64, 2:41-43 (Miller); 5:8, 23-30 (Pennock)).	35. Since the scientific revolution of the 16th and 17th centuries, science has been limited to the search for natural causes to explain natural phenomena. 9:19-22 (Haught); 5:25-29 (Pennock); 1:62 (Miller). This revolution entailed the rejection of the appeal to authority, and by extension, revelation, in favor of empirical evidence. 5 :28 (Pennock) ("That's probably what's most characteristic of the scientific revolution, rejecting appeal to authority and saying we will appeal just to the evidence, the empirical evidence. "). Consequently, since that time, science has been a discipline in which testability, rather than any ecclesiastical authority or philosophical coherence, has been the measure of a scientific idea's worth. 9:21-22 (Haught); I :63 (Miller). 36. Science has deliberately left out theological or "ultimate" explanations for the existence or characteristics of the natural world. 9 :21 (Haught). Science does not consider issues of "meaning and purpose" in the world. 1 :64, 87 (Miller). 37. Supernatural explanations are important and may have merit, but they are not part of science. 3:103 (Miller); 9:19-20 (Haught). 38. This self-imposed convention of science, which limits inquiry to testable, natural explanations about the natural world, is referred to by philosophers as "methodological naturalism." 5:23,29-30 (Pennock). 39. Methodological naturalism, also sometimes known as the scientific method, is a "ground rule" of science today. 1 :59 (Miller); 5: 8, 23 (Pennock). This "ground rule" of science requires scientists to seek explanations in the world around us based upon things we can observe, test, replicate and verify. 1:59-64,2:41-43 (Miller); 5:23-30 (Pennock). Professor Minnich agrees that methodological naturalism is the current rule of science. 38:97.
As the National Academy of Sciences (hereinafter "NAS") was recognized by experts for both parties as the "most prestigious" scientific association in this country, we will accordingly cite to its opinion where appropriate. (1:94, 160-61 (Miller); 14:72 (Alters); 37:31 (Minnich)). NAS is in agreement that science is limited to empirical, observable and	40. The National Academy of Sciences (NAS) was recognized by experts for both sides as being the "most prestigious" scientific association in this country. 1 :94 ("probably the most prestigious scientific association in the world"), 160-61 (Miller); 14:72 (Alters); 37:31 (Minnich). Accordingly, where appropriate, the Court cites to the NAS position.

ultimately testable data: "Science is a particular way of knowing about the world. In science, explanations ***736** are restricted to those that can be inferred from the confirmable data--the results obtained through observations and experiments that can be substantiated by other scientists. Anything that can be observed or measured is amenable to scientific investigation. Explanations that cannot be based upon empirical evidence are not part of science." (P-649 at 27).	41. NAS agrees that science is limited to empirical, observable and ultimately testable data: "Science is a particular way of knowing about the world. In science, explanations are restricted to those that can be inferred from the confirmable data - the results obtained through observations and experiments that can be substantiated by other scientists. Anything that can be observed or measured is amenable to scientific investigation. Explanations that cannot be based on empirical evidence are not a part of science." P649, at 27 *(Teaching about Evolution and the Nature of Science,* National Academy Press (2003)). The restriction to natural explanations in science is implicit in this definition because non-natural explanations are not testable.
This rigorous attachment to "natural" explanations is an essential attribute to science by definition and by convention. (1:63 (Miller); 5:29-31 (Pennock)). We are in agreement with Plaintiffs' lead expert Dr. Miller, that from a practical perspective, attributing unsolved problems about nature to causes and forces that lie outside the natural world is a "science stopper." (3:14-15 (Miller)). As Dr. Miller explained, once you attribute a cause to an untestable supernatural force, a proposition that cannot be disproven, there is no reason to continue seeking natural explanations as we have our answer. *Id.*	42. This rigorous attachment to "natural" explanations is an essential attribute of science. 1 :63 (Miller); 5:29-31 (Pennock). Both definitionally and by convention, science is limited to "natural" explanations. 5:29-30 (Pennock). Science is the "systematic search for natural explanations for natural phenomena." 1 :59,63 (Miller); 5:30 (Pennock). This search is dependent on empirical observations - what we can observe and measure -- that can be tested, replicated and disproven. 1 :63 (Miller). If non-natural explanations are allowed, *e.g.,* Dr. Miller's example about God's role in helping the Red Sox win the world series, the systematic search for "natural causes" is completely undermined. 1 :6364 (Miller). As Pennock testified, allowing non-natural explanations is "cheating"; you "can't just call for quick assistance to some supernatural power. It would certainly make science very easy ... " but it would also fundamentally alter the practice of science. 5:30 (Pennock). From a practical perspective, attributing unsolved problems about nature to causes and forces that lie outside the natural world is a "science stopper." 3:14-15 (Miller). Once you attribute a cause to an untestable supernatural force, a proposition that cannot be disproven, there is no reason to continue seeking natural explanations - we have our answer. *Id.*
ID is predicated on supernatural causation, as we previously explained and as various expert testimony	43. Intelligent design is predicated on supernatural causation. 17:96 (Padian); 2:35-36 (Miller); 14:62

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<tr><td>revealed. (17:96 (Padian); 2:35-36 (Miller); 14:62 (Alters)). ID takes a natural phenomenon and, instead of accepting or seeking a natural explanation, argues that the explanation is supernatural. (5:107 (Pennock)). Further support for the conclusion that ID is predicated on supernatural causation is found in the ID reference book to which ninth grade biology students are directed, Pandas. Pandas states, in pertinent part, as follows:
<blockquote>Darwinists object to the view of intelligent design because it does not give a natural cause explanation of how the various forms of life started in the first place. Intelligent design means that various forms of life began abruptly, through an intelligent agency, with their distinctive features already intact--fish with fins and scales, birds with feathers, beaks, and wings, etc.</blockquote>P-11 at 99-100 (emphasis added). Stated another way, ID posits that animals did not evolve naturally through evolutionary means but were created abruptly by a non-natural, or supernatural, designer. Defendants' own expert witnesses acknowledged this point. (21:96-100 (Behe); P-718 at 696, 700) ("implausible that the designer is a natural entity"); 28:21-22 (Fuller) ("... ID's rejection of naturalism and commitment to supernaturalism ..."); 38:95-96 (Minnich) (ID does not exclude the possibility of a supernatural designer, including deities).</td>
<td>(Alters). Intelligent design takes a natural phenomenon and, instead of accepting or seeking a natural explanation, argues that the explanation is supernatural. 5: 1 07 (Pennock).

44. The intelligent-design reference book cited in the Dover statement as describing "what intelligent design actually involves," Of Pandas and People, is clear that the idea entails supernatural causation: "Darwinists object to the view of intelligent design because it does not give a natural cause explanation of how the various forms of life started in the first place. Intelligent design means that various forms of life began abruptly, through an intelligent agency, with their distinctive feature already intact - fish with fins and scales, birds with feathers, beaks, and wings, etc." Pll, at 99-100. (Emphasis added). In other words, animals did not evolve naturally, through evolutionary means, but rather were created abruptly by a non-natural, or supernatural, designer.

45. Even defendants' own expert witnesses acknowledged this point. 21:96-100 (Behe); see also, P718, Michael Behe, Reply to Critics, at 696, 700 ("implausible that the designer is a natural entity"); 28:21-22 (Fuller) (" .. .ID's rejection of naturalism and commitment to supernaturalism ... "),24; 38:95-96 (Minnich) (ID does not exclude possibility of supernatural designer, including deities).</td></tr>
<tr><td>It is notable that defense experts' own mission, which mirrors that of the IDM itself, is to change the ground rules of science to allow supernatural causation of the natural world, which the Supreme Court in Edwards and the court in McLean correctly recognized as an inherently religious concept. Edwards, 482 U.S. at 591-92, 107 S.Ct. 2573; McLean, 529 F.Supp. at 1267. First, defense expert Professor Fuller agreed that ID aspires to "change the ground rules" of science and lead defense expert Professor Behe admitted that his broadened definition of science, which encompasses ID, would also embrace astrology. (28:26 (Fuller); 21:37-42 (Behe)). Moreover, defense expert Professor Minnich acknowledged that for ID to be considered science, the ground rules of science have to be broadened to allow consideration of supernatural forces. (38:97 (Minnich)).</td>
<td>46. Indeed, defendants' argument, which mirrors that of the intelligent-design movement, is to change the ground rules of science to allow supernatural causation of the natural world. 5:32 (Pennock). Professor Fuller agreed that intelligent design aspires to "change the ground rules" of science. 28:26. Professor Behe admitted that his broadened definition of science, which encompasses intelligent design, would also embrace astrology. 21:37-42 (Behe). Professor Minnich acknowledged that for intelligent design to be considered science, the ground rules of science have to be broadened to allow consideration of supernatural causes. 38:97.</td></tr>
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Prominent IDM leaders are in agreement with the opinions expressed by defense expert witnesses that the ground rules of science must be changed for ID to take hold and prosper. William Dembski, for instance, an IDM leader, proclaims that science is ruled by methodological naturalism and argues that this rule must ***737** be overturned if ID is to prosper. (5:32-37 (Pennock)); P-341 at 224 ("Indeed, entire fields of inquiry, including especially in the human sciences, will need to be rethought from the ground up in terms of intelligent design.").	47. William Dembski, an intelligent-de sign-movement leader, proclaims that science is ruled by methodological naturalism and argues that this rule must be overturned if intelligent design is to prosper. 5:32-37 (Pennock). Dembski contends that "the scientific picture of the world championed since the Enlightenment is not just wrong, but massively wrong. Indeed, entire fields of inquiry, including especially the human sciences, will need to be rethought from the ground up in terms of intelligent design." 5:35 (Pennock); P341 (William Dembski, *Intelligent Design: A Bridge Between Science and Theology,* at 224.
The Discovery Institute, the think tank promoting ID whose CRSC developed the Wedge Document, acknowledges as "Governing Goals" to "defeat scientific materialism and its destructive moral, cultural and political legacies" and "replace materialistic explanations with the theistic understanding that nature and human beings are created by God." (P-140 at 4). In addition, and as previously noted, the Wedge Document states in its "Five Year Strategic Plan Summary" that the IDM's goal is to replace science as currently practiced with "theistic and Christian science." *Id.* at 6. The IDM accordingly seeks nothing less than a complete scientific revolution in which ID will supplant evolutionary theory. [FN14]	48. The Discovery Institute, the think tank promoting intelligent design, has also acknowledged that the goal is to "defeat scientific materialism" and "to replace materialistic explanations with the theistic understanding that nature and human beings are created by God." P140, at 6 (The Wedge Document). *See supra.* ~ 11. 10. The Wedge Document states in its "Five Year Strategic Plan Summary" that the intelligent design movement's goal is to replace science as currently practiced with "theistic and Christian science." P140, at 6. Professor Behe's book *Darwin's Black Box* is mentioned prominently in this section of the document as having advanced this objective, an association that he has not demurred from in any way. *Id.*
FN14. Further support for this proposition is found in the Wedge Strategy, which is composed of three phases: Phase I is scientific research, writing and publicity; Phase II is publicity and opinion-making; and Phase III is cultural confrontation and renewal. (P-140 at 3). In the "Five Year Strategic Plan Summary," the Wedge Document explains that the social consequences of materialism have been "devastating" and that it is necessary to broaden the wedge with a positive scientific alternative to materialistic scientific theories, which has come to be called the	

theory of ID. "Design theory promises to reverse the stifling dominance of the materialist worldview, and to replace it with a science consonant with Christian and theistic convictions." *Id.* at 6. Phase I of the Wedge Strategy is an essential component and directly references "scientific revolutions." Phase II explains that alongside a focus on influential opinion-makers, "we also seek to build up a popular base of support among our natural constituency, namely, Christians. We will do this primarily through apologetics seminars. We intend these to encourage and equip believers with new scientific evidence that support the faith, as well as to 'popularize' our ideas in the broader culture." *Id.* Finally, Phase III includes pursuing possible legal assistance "in response to resistance to the integration of design theory into public school science curricula." *Id.* at 7.	
Notably, every major scientific association that has taken a position on the issue of whether ID is science has concluded that ID is not, and cannot be considered as such. (1:98-99 (Miller); 14:75-78 (Alters); 37:25 (Minnich)). Initially, we note that NAS, the "most prestigious" scientific association in this country, views ID as follows: Creationism, intelligent design, and other claims of supernatural intervention in the origin of life or of species are not science because they are not testable by the methods of science. These claims subordinate observed data to statements based on authority, revelation, or religious belief. Documentation offered in support of these claims is typically limited to the special publications of their advocates. These publications do not offer hypotheses subject to change in light of new data, new interpretations, or demonstration of error. This contrasts with science, where any hypothesis or theory always remains subject to the possibility of rejection or modification in the light of new knowledge. P-192 at 25. Additionally, the American Association for the Advancement of Science (hereinafter "AAAS"), the largest organization of scientists in this country, has taken a similar position on ID,	49. Every major scientific association that has taken a position on this issue has stated that intelligent design is not, and cannot be considered, Science. 1 :98-99 (Miller); 14:75-78 (Alters); 37:25 (Minnich). 50. For example, NAS views intelligent design as follows: "Creationism, intelligent design, and other claims of supernatural intervention in the origin of life or of species are not science because they are not testable by the methods of science. These claims subordinate observed data to statements based on authority, revelation, or religious belief. Documentation offered in support of these claims is typically limited to the special publications of their advocates. These publications do not offer hypotheses subject to change in light of new data, new interpretations, or demonstration of error. This contrasts with science, where any hypothesis or theory always remains subject to the possibility of rejection or modification in the light of new knowledge." P192, at 25 (National Academy Press, *Science and Creationism: A View from the National Academy of Sciences* (2d Ed. 1999)). 51. The largest organization of scientists in this

namely, that it "has not proposed a scientific means of testing its claims" and that "the lack of scientific warrant for so-called 'intelligent design theory' makes it improper to include as part of science education ..." (P-198). Not a single expert witness over the course of the six week trial identified one ***738** major scientific association, society or organization that endorsed ID as science. What is more, defense experts concede that ID is not a theory as that term is defined by the NAS and admit that ID is at best "fringe science" which has achieved no acceptance in the scientific community. (21:37-38 (Behe); Fuller Dep. at 98- 101, June 21, 2005; 28:47 (Fuller); Minnich Dep. at 89, May 26, 2005).	country, the American Association for the Advancement of Science ("AAAS"), has taken a similar position on intelligent design, namely, that it "has not proposed a scientific means of testing its claims" and that "the lack of scientific warrant for so-called 'intelligent design theory' makes it improper to include as part of science education .... " P198 *(AAAS Board Resolution on Intelligent Design Theory, Oct. 18, 2002).* 52. Neither plaintiffs' nor defendants' expert witnesses identified a single major scientific association, society or organization that endorsed intelligent design as science. 53. Defendant's experts admit that intelligent design is not a theory as that term is defined by the NAS. 21 :37-38 (Behe); Fuller Dep. 98. According to Professor Behe, intelligent design is a scientific theory only if that term is defined loosely enough to also include astrology. 21:38-39. 54. Defendants' expert Steve Fuller described intelligent design as "fringe science," which need affirmative action to become accepted. 28:47 Defendants' expert Scott Minnich admitted that intelligent design has achieved no acceptance in the scientific community; it is science "in its infancy." Minnich Dep. at 89.
It is therefore readily apparent to the Court that ID fails to meet the essential ground rules that limit science to testable, natural explanations. (3:101-03 (Miller); 14:62 (Alters)). Science cannot be defined differently for Dover students than it is defined in the scientific community as an affirmative action program, as advocated by Professor Fuller, for a view that has been unable to gain a foothold within the scientific establishment. Although ID's failure to meet the ground rules of science is sufficient for the Court to conclude that it is not science, out of an abundance of caution and in the exercise of completeness, we will analyze additional arguments advanced regarding the concepts of ID and science.	55. Intelligent design does not, therefore, meet the essential ground rules that limit science to testable, natural explanations. 3:101-03 (Miller); 14:62 (Alters). 56. Science cannot be defined differently for Dover students than it is defined in the scientific community as an affirmative action program for a view that has been unable to gain a foothold within the scientific establishment. Intelligent design's failure to meet the ground rules of science is alone enough for this Court to rule that it is not a scientific view.
ID is at bottom premised upon a false dichotomy, namely, that to the extent evolutionary theory is	57. Intelligent design is premised on a false dichotomy, namely, that to the extent evolutionary

discredited, ID is confirmed. (5:41 (Pennock)). This argument is not brought to this Court anew, and in fact, the same argument, termed "contrived dualism" in *McLean,* was employed by creationists in the 1980's to support "creation science." The court in *McLean* noted the "fallacious pedagogy of the two model approach" and that "[i]n efforts to establish 'evidence' in support of creation science, the defendants relied upon the same false premise as the two model approach ... all evidence which criticized evolutionary theory was proof in support of creation science." *McLean,* 529 F.Supp. at 1267, 1269. We do not find this false dichotomy any more availing to justify ID today than it was to justify creation science two decades ago.	theory is discredited, intelligent design is confirmed. 5 :41 (Pennock). This same argument, termed "contrived dualism" in *McLean v. Arkansas Board of Education,* was employed by creationists in the 1980's to support "creation science." This argument is no more availing to justify intelligent design today than it was to justify creation science two decades ago.
ID proponents primarily argue for design through negative arguments against evolution, as illustrated by Professor Behe's argument that "irreducibly complex" systems cannot be produced through Darwinian, or any natural, mechanisms. (5:38-41 (Pennock); 1:39, 2:15, 2:35-37, 3:96 (Miller); 16:72- 73 (Padian); 10:148 (Forrest)). However, we believe that arguments against evolution are not arguments for design. Expert testimony revealed that just because scientists cannot explain today how biological systems evolved does not mean that they cannot, and will not, be able to explain them tomorrow. (2:36- 37 (Miller)). As Dr. Padian aptly noted, "absence of evidence is not evidence of absence." (17:45 (Padian)). To that end, expert testimony from Drs. Miller and Padian provided multiple examples where *Pandas* asserted that no natural explanations exist, and in some cases that none could exist, and yet natural explanations have been identified in the intervening years. It also bears mentioning that as Dr. Miller stated, just because scientists cannot explain every evolutionary detail does not undermine its validity as a scientific theory as no theory in science is fully understood. (3:102 (Miller)).	58. Intelligent design proponents primarily argue for design through negative argument against evolution, including Professor Behe' s argument that "irreducibly complex" systems cannot be produced through Darwinian, or any natural, mechanisms. 5:38-41 (Pennock). 1:39,2:15,2:35-37,3:96 (Miller); 16:72-73 (Padian); 5:38-41 (Pennock); 10:148 (Forrest). Intelligent design attempts to "poke holes" in evolutionary theory - to say that Darwinian mechanisms, meaning natural causes, cannot explain life's complexity. 5:39 (Pennock). 61. Arguments *against* evolution are not arguments *for* design. Just because scientists cannot explain today how biological systems evolved does not mean they cannot, and will not, be able to explain them tomorrow. 2:36-37 (Miller). In Dr. Padian's words, "absence of evidence is not evidence of absence." 17:45. Testimony from Drs. Miller and Padian was replete with examples where *Pandas* asserted that no natural explanations exist, and in some cases that none could exist, and yet natural explanations have been identified in the intervening years, *e.g.,* intermediate fossils showing evolution of the whale, evolution of the immune system, mapping of the chimpanzee genome "spectacularly confirming" common ancestry between humans and great apes, etc. 62. Just because scientists cannot explain every evolutionary detail does not undermine its validity as a scientific theory. No theory in science is fully understood.

As referenced, the concept of irreducible complexity is ID's alleged scientific centerpiece. Irreducible complexity is a negative argument against evolution, not proof of design, a point conceded by defense expert Professor Minnich. (2:15 (Miller); 38:82 (Minnich)) (irreducible complexity "is not a test of intelligent design; it's a test of evolution"). Irreducible complexity additionally fails to make a positive scientific case for ID, as will be elaborated upon below.	64. Irreducible complexity, intelligent design's alleged scientific centerpiece, is simply a negative argument against evolution, not proof of design, 2:15 (Miller), a point conceded by Professor Minnich. 38:82 (irreducible complexity "is not a test of intelligent design; it's a test of evolution"). It fails to make any positive scientific case for intelligent design. Moreover, the evidence demonstrates that irreducible complexity fails even as a purely negative argument.
***739** We initially note that irreducible complexity as defined by Professor Behe in his book *Darwin's Black Box* and subsequently modified in his 2001 article entitled "Reply to My Critics," appears as follows: By irreducibly complex I mean a single system which is composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning. An irreducibly complex system cannot be produced directly by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition nonfunctional ... Since natural selection can only choose systems that are already working, then if a biological system cannot be produced gradually it would have to arise as an integrated unit, in one fell swoop, for natural selection to have anything to act on. P-647 at 39; P-718 at 694. Professor Behe admitted in "Reply to My Critics" that there was a defect in his view of irreducible complexity because, while it purports to be a challenge to natural selection, it does not actually address "the task facing natural selection." (P-718 at 695). Professor Behe specifically explained that "[t]he current definition puts the focus on removing a part from an already-functioning system," but "[t]he difficult task facing Darwinian evolution, however, would not be to remove parts from sophisticated pre-existing systems; it would be to bring together components to make a new system in the first place." *Id.* In that article, Professor Behe wrote that he hoped to "repair this defect in future work;" however, he has failed to do so even four years after elucidating his defect. *Id.;* 22:61-65 (Behe).	65. Irreducible complexity was defined by Professor Behe in *Darwin's Black Box* and modified in his 2001 article *Reply to My Critics,* as follows: ""By *irreducibly complex* I mean a single system which is composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of anyone of the parts causes the system to effectively cease functioning. An irreducibly complex system cannot be produced directly by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition nonfunctional. *** Since natural selection can only choose systems that are already working, then if a biological system cannot be produced gradually it would have to arise as an integrated unit, in one fell swoop, for natural selection to have anything to act on." P647, Behe, Michael, *Darwin's Black Box,* at 39, Free Press (1996). P718, at 694. 66. Professor Behe admitted in *Reply to My Critics* that there was a defect in his view of irreducible complexity because, while it purports to be a challenge to natural selection, it does not actually address "the task facing natural selection." P718, at 695. Specifically, Behe explained that "[t]he current definition puts the focus on removing a part from an already-functioning system," but "[t]he difficult task facing Darwinian evolution, however, would not be to remove parts from sophisticated pre-existing systems; it would be to bring together components to make a new system in the first place." P718, at 695. In that article, Professor Behe wrote that he hoped to "repair this defect in future work," P718, at 695, but he never has. 22:61-65.

In addition to Professor Behe's admitted failure to properly address the very phenomenon that irreducible complexity purports to place at issue, natural selection, Drs. Miller and Padian testified that Professor Behe's concept of irreducible complexity depends on ignoring ways in which evolution is known to occur. Although Professor Behe is adamant in his definition of irreducible complexity when he says a precursor "missing a part is by definition nonfunctional," what he obviously means is that it will not function in the same way the system functions when all the parts are present. For example in the case of the bacterial flagellum, removal of a part may prevent it from acting as a rotary motor. However, Professor Behe excludes, by definition, the possibility that a precursor to the bacterial flagellum functioned not as a rotary motor, but in some other way, for example as a secretory system. (19:88-95 (Behe)).	This admitted failure to properly address the very phenomenon that irreducible complexity purports to place at issue - natural selection - is a damning indictment of the entire proposition. 67. Dr. Miller and Dr. Padian explained that Professor Behe' s concept of irreducible complexity depends on ignoring ways in which evolution is known to occur. Behe was adamant that in his definition of irreducible complexity when he says a precursor "missing a part is by definition nonfunctional," what he means is that it won't function in the way the system functions when all the parts are present - for example, in the case of the bacterial flagellum, as a rotary motor. 19:88. He excludes, by definition, the possibility that a precursor functioned in some other way - for example, in the case of the bacterial flagellum, as a secretory system. 19:88-95.
As expert testimony revealed, the qualification on what is meant by "irreducible complexity" renders it meaningless as a criticism of evolution. (3:40 (Miller)). In fact, the theory of evolution proffers exaptation as a well-recognized, well-documented explanation for how systems with multiple parts could have evolved through natural means. Exaptation means that some precursor of the subject system had a different, selectable function before experiencing the change or addition that resulted in the subject system with its present function (16:146-48 (Padian)). For instance, Dr. Padian identified the evolution of the mammalian middle ear bones from what had been jawbones as an example of this process. (17:6-17 (Padian)). By defining irreducible complexity in the way that he has, Professor Behe attempts to exclude the phenomenon of exaptation by definitional fiat, ignoring as he does so abundant evidence which refutes his argument.	68. This qualification on what is meant by "irreducible complexity" renders it meaningless as a criticism of evolution. 3:40 (Miller)... 69. In fact, the theory of evolution has a well-recognized, well-documented explanation for how systems with multiple parts could have evolved through natural means, namely, exaptation. Exaptation means that some precursor of the subject system had a different, selectable function before experiencing the change or addition that resulted in the subject system with its present function. 16: 146-48 (Padian). For instance, Dr. Padian identified the evolution of the mammalian middle ear bones from what had been jawbones as an example of this process. 17: 6-17. The existence of feathers for other purposes in flightless dinosaurs is another example. 17: 131-45. Even Professor Minnich freely admitted that bacteria living in soil polluted with DNT on an U.S. Air Force base had evolved a complex, multiple-protein biochemical pathway by exaptation of proteins with other functions (38: 71) ("This entire pathway didn't evolve to specifically attack this sub straight [substrate], all right. There was probably a modification of two or three enzymes, perhaps cloned in from a different system that ultimately allowed this to be broken down.") By defining irreducible complexity in the way he has, Professor Behe attempts to exclude the phenomenon of exaptation by

	definitional fiat. He asserts that evolution could not work by excluding one important way that evolution is known to work.
***740** Notably, the NAS has rejected Professor Behe's claim for irreducible complexity by using the following cogent reasoning: [S]tructures and processes that are claimed to be "irreducibly" complex typically are not on closer inspection. For example, it is incorrect to assume that a complex structure or biochemical process can function only if all its components are present and functioning as we see them today. Complex biochemical systems can be built up from simpler systems through natural selection. Thus, the "history" of a protein can be traced through simpler organisms ... The evolution of complex molecular systems can occur in several ways. Natural selection can bring together parts of a system for one function at one time and then, at a later time, recombine those parts with other systems of components to produce a system that has a different function. Genes can be duplicated, altered, and then amplified through natural selection. The complex biochemical cascade resulting in blood clotting has been explained in this fashion. P-192 at 22.	70. The National Academy of Sciences has rejected Professor Behe's claim for irreducible complexity, using this same reasoning. "[S]tructures and processes that are claimed to be "irreducibly" complex typically are not on closer inspection. For example, it is incorrect to assume that a complex structure or biochemical process can function only if all its components are present and functioning as we see them today. Complex biochemical systems can be built up from simpler systems through natural selection. Thus, the "history" of a protein can be traced through simpler organisms. lawless fish have a simpler hemoglobin than do jawed fish, which in turn have a simpler hemoglobin than mammals. *** The evolution of complex molecular systems can occur in several ways. Natural selection can bring together parts of a system for one function at one time and then, at a later time, recombine those parts with other systems of components to produce a system that has a different function. Genes can be duplicated, altered, and then amplified through natural selection. The complex biochemical cascade resulting in blood clotting has been explained in this fashion." P192, at 22.
As irreducible complexity is only a negative argument against evolution, it is refutable and accordingly testable, unlike ID, by showing that there are intermediate structures with selectable functions that could have evolved into the allegedly irreducibly complex systems. (2:15-16 (Miller)). Importantly, however, the fact that the negative argument of irreducible complexity is testable does not make testable the argument for ID. (2:15 (Miller); 5:39 (Pennock)). Professor Behe has applied the concept of irreducible complexity to only a few select systems: (1) the bacterial flagellum; (2) the blood-clotting cascade; and (3) the immune system. Contrary to Professor Behe's assertions with respect to these few biochemical systems among the myriad existing in nature, however, Dr. Miller presented evidence, based upon peer-reviewed	71. Professor Behe has applied irreducible complexity only to a few select systems: the bacterial flagellum, the blood-clotting cascade and the immune system. As discussed below, Professor Behe has admitted there are no peerreviewed articles arguing for the irreducible complexity of the bacterial flagellum, the blood-clotting cascade and the immune system, or any other purportedly irreducibly complex system. 72. Because it is only a negative argument against evolution, irreducible complexity, unlike intelligent design, is testable, by showing that there are intermediate structures, with selectable functions, that could have evolved into the allegedly irreducibly complex systems. 2: 15-16 (Miller). The fact that this negative argument is testable does not make the argument for intelligent design testable. 2:15 (Miller);

studies, that they are not in fact irreducibly complex.	5:39-39 (Pennock). 73. Dr. Miller presented evidence, based on peer-reviewed studies, that the biochemical systems claimed to be irreducibly complex by Professor Behe were in fact not so. 2:21-36.
First, with regard to the bacterial flagellum, Dr. Miller pointed to peer-reviewed studies that identified a possible precursor to the bacterial flagellum, a subsystem that was fully functional, namely the Type-III Secretory System. (2:8-20 (Miller); P-854.23-854.32). Moreover, defense expert Professor Minnich admitted that there is serious scientific research on the question of whether the bacterial flagellum evolved into the Type-III Secretary System, the Type-III Secretory System into the bacterial flagellum, or whether they both evolved from a common ancestor. (38:12-16 (Minnich)). None of this research or thinking involves ID. (38:12-16 (Minnich)). In fact, Professor Minnich testified about his research as follows: "we're looking at the function of these systems and how they could have been derived one from the other. And it's a legitimate scientific inquiry." (38:16 (Minnich)).	74. Dr. Miller pointed to peer-reviewed studies that identified a possible pre-cursor to the bacterial flagellum, a subsystem that was fully functional, namely, the Type-III Secretory System. 2:8-20; P854.23-854.32. (on bacterial flagellum). Professor Minnich admits that there is serious scientific research on the question of whether the bacterial flagellum evolved into the Type III Secretory System, the Type-III Secretory System into the bacterial flagellum, or they both evolved from a common ancestor, and none of this research or thinking is considering intelligent design. (38: 12-16). He testified about this research: "we're looking at the function of these systems and how they could have been derived one from the other. And it's a legitimate scientific inquiry." (38: 16). . . .
Second, with regard to the blood-clotting cascade, Dr. Miller demonstrated that the alleged irreducible complexity of the blood-clotting cascade has been disproven by peer-reviewed studies dating back to 1969, which show that dolphins' and whales' blood clots despite missing a part of the cascade, a study that was confirmed by molecular testing in 1998. (1:122-29 (Miller); P-854.17-854.22). Additionally and more recently, scientists published studies showing that in puffer fish, blood clots despite the cascade missing not only one, but three parts. (1:128-29 (Miller)). Accordingly, scientists in peer-reviewed publications have refuted Professor Behe's predication about the alleged irreducible complexity of the blood-clotting cascade. ***741** Moreover, cross-examination revealed that Professor Behe's redefinition of the blood-clotting system was likely designed to avoid peer-reviewed scientific evidence that falsifies his argument, as it was not a	75. Dr. Miller demonstrated that the alleged irreducible complexity of the blood-clotting cascade has been disproven by peer-reviewed studies going back to 1969, which showed that dolphins' and whales' blood clots despite missing a part of the cascade, a study that was confirmed by molecular testing in 1998. 1: 122-29; P854.17-854.22. More recently, scientists published studies showing that in puffer fish, blood clots despite the cascade missing not only one, but three parts. 1: 128-29. **In** sum, scientists in peer-reviewed publications have refuted Behe's prediction about the alleged irreducible complexity of the blood-clotting cascade. Professor Behe tried to elide this compelling evidence by redefining the blood clotting system. (Behe) 20:26-28. Cross-examination revealed this to be an argument of convenience designed to avoid peer-reviewed scientific evidence that falsifies his argument, not a scientifically warranted redefinition. (Behe) 22: 112-

scientifically warranted redefinition. (20:26-28, 22:112-25 (Behe)).	125
The immune system is the third system to which Professor Behe has applied the definition of irreducible complexity. Although in *Darwin's Black Box,* Professor Behe wrote that not only were there no natural explanations for the immune system at the time, but that natural explanations were impossible regarding its origin. (P-647 at 139; 2:26-27 (Miller)). However, Dr. Miller presented peer-reviewed studies refuting Professor Behe's claim that the immune system was irreducibly complex. Between 1996 and 2002, various studies confirmed each element of the evolutionary hypothesis explaining the origin of the immune system. (2:31 (Miller)). In fact, on cross-examination, Professor Behe was questioned concerning his 1996 claim that science would never find an evolutionary explanation for the immune system. He was presented with fifty-eight peer-reviewed publications, nine books, and several immunology textbook chapters about the evolution of the immune system; however, he simply insisted that this was still not sufficient evidence of evolution, and that it was not "good enough." (23:19 (Behe)).	76. Dr. Miller also presented peer-reviewed studies refuting Professor Behe's claim that the immune system was irreducibly complex. 2:21-36; P854.33-854.41. Professor Behe wrote in *Darwin's Black Box* not only that there were no natural explanations at the time, but that in fact natural explanations were impossible: "As scientists, we yearn to understand how this magnificent mechanism came to be, but the complexity of the system dooms all Darwinian explanations to frustration. Sisyphus himself would pity us," P647, at 139; 2:2627 (Miller). Professor Behe argued that scientists should not even bother to investigate. 2:27 (Miller). However, scientists did not heed Professor Behe's admonition, and, between 1996 and 2005, various studies confirmed each element of the evolutionary hypothesis explaining the origin of the immune system. 2:31 (Miller). 77. On cross-examination Professor Behe was questioned about his 1996 claim that science would never find an evolutionary explanation for the immune system. He was confronted with the fifty-eight peer-reviewed publications, nine books and several immunology text-book chapters about the evolution of the immune system, P256, 280, 281, 283, 747, 748, 755 and 743, and he insisted that this was still not sufficient evidence of evolution - it was "not good enough." 23:19.
We find that such evidence demonstrates that the ID argument is dependent upon setting a scientifically unreasonable burden of proof for the theory of evolution. As a further example, the test for ID proposed by both Professors Behe and Minnich is to grow the bacterial flagellum in the laboratory; however, no-one inside or outside of the IDM, including those who propose the test, has conducted it. (P-718; 18:125-27 (Behe); 22:102-06 (Behe)). Professor Behe conceded that the proposed test could not approximate real world conditions and even if it could, Professor Minnich admitted that it would merely be a test of evolution, not design. (22:107-10 (Behe); 2:15 (Miller); 38:82 (Minnich)).	78. This evidence demonstrates that the intelligent design argument depends on setting a burden of proof for the theory of evolution that is scientifically unreasonable. 79. As a further example, the test for intelligent design proposed by both Professors Behe and Minnich is to grow the bacterial flagellum in the laboratory. P718, 18:125-127. But nobody inside or outside the intelligent-design movement, including Behe and Minnich, has conducted this test. 22: 102-06 (Behe). Professor Behe admitted that the proposed test could not approximate real world conditions. 22:107-110. And even if it could, it would be merely a test of

	evolution, not design, 2: 15 (Miller), a point conceded by Professor Minnich. 38: 82 ("it's not a test of lD, it's a test of evolution").
We therefore find that Professor Behe's claim for irreducible complexity has been refuted in peer-reviewed research papers and has been rejected by the scientific community at large. (17:45-46 (Padian); 3:99 (Miller)). Additionally, even if irreducible complexity had not been rejected, it still does not support ID as it is merely a test for evolution, not design. (2:15, 2:35-40 (Miller); 28:63-66 (Fuller)).	80. In summary, Professor Behe's claim for irreducible complexity has been refuted in peer-reviewed research papers and has been rejected by the scientific community. 17:45-46 (Padian); 3:99 (Miller). Moreover, even if irreducible complexity had not been rejected, it still does not support intelligent design. 2: 15,2:35-40 (Miller); 28:63-66 (Fuller - ID doesn't follow logically). Irreducible complexity is merely a test for evolution, not design. 2: 15 (Miller).
We will now consider the purportedly "positive argument" for design encompassed in the phrase used numerous times by Professors Behe and Minnich throughout their expert testimony, which is the "purposeful arrangement of parts." Professor Behe summarized the argument as follows: We infer design when we see parts that appear to be arranged for a purpose. The strength of the inference is quantitative; the more parts that are arranged, the more intricately they interact, the stronger is our confidence in design. The appearance of design in aspects of biology is overwhelming. Since nothing other than an intelligent cause has been demonstrated to be able to yield such a strong appearance of design, Darwinian claims notwithstanding, the conclusion that the design seen in life is real design is rationally justified. (18:90-91, 18:109-10 (Behe); 37:50 (Minnich)). As previously indicated, this argument is merely a restatement of the Reverend William Paley's argument applied at the cell level. Minnich, Behe, and Paley reach the same conclusion, that complex organisms must have been designed using the same reasoning, except that Professors Behe and Minnich ***742** refuse to identify the designer, whereas Paley inferred from the presence of design that it was God. (1:6-7 (Miller); 38:44, 57 (Minnich)). Expert testimony revealed that this inductive argument is not scientific and as admitted by Professor Behe, can never be ruled out. (2:40 (Miller); 22:101 (Behe); 3:99 (Miller)).	82. The purportedly positive argument for design, espoused repeatedly by Professors Behe and Minnich, is encompassed in the phrase, "purposeful arrangement of parts." 18:91 ("I discussed this in my book, Darwin's Black Box, and a short description of design is shown in this quotation from Chapter 9. Quote, What is design? Design is simply the purposeful arrangement of parts. When we perceive that parts have been arranged to fulfill a purpose, that's when we infer design."); 19:55 ("the positive argument for it is the purposeful arrangement of parts, as I have described. "); 19: 1 02 (" ... I want to re-emphasize to say that it is important to keep in mind that the positive inductive argument for design is in the purposeful arrangement of parts."). 83. Professor Behe summarized the argument as follows: We infer design when we see parts that appear to be arranged for a purpose. The strength of the inference is quantitative; the more parts that are arranged, and the more intricately they interact, the stronger is our confidence in design. The appearance of design in aspects of biology is overwhelming. Since nothing other than an intelligent cause has been demonstrated to be able to yield such a strong appearance of design, Darwinian claims notwithstanding, the conclusion that the design seen in life is real design is rationally justified. 18:90-91 (Behe slides, at 7); *18:109-110. See also,* 37:50 (Minnich). 84. This is not a new argument, but a restatement of the Reverend William Paley's argument applied at the

	cell level. 1 :6-7 (Miller); 38:44, 57 (Minnich). Minnich, Behe and Paley reach the same conclusion that complex organisms must have been designed using the same reasoning, except that Professors Behe and Minnich refuse to identify the designer, whereas Paley inferred from the presence of design that it was God. *Id.* 85. This inductive argument is not scientific. 2:40 (Miller). As Professor Behe admitted, it can never be ruled out. 22:101. *See also,* 3:99 (Miller).
Indeed, the assertion that design of biological systems can be inferred from the "purposeful arrangement of parts" is based upon an analogy to human design. Because we are able to recognize design of artifacts and objects, according to Professor Behe, that same reasoning can be employed to determine biological design. (18:116-17, 23:50 (Behe)). Professor Behe testified that the strength of the analogy depends upon the degree of similarity entailed in the two propositions; however, if this is the test, ID completely fails.	86. The assertion that design of biological systems can be inferred from the "purposeful arrangement of parts" is based on an analogy to human design. According to Professor Behe, because we are able to recognize design of artifacts and objects, that same reasoning can be employed to determine biological design. 18:116-17; 23:50. 87. Professor Behe testified that the strength of an analogy depends on the degree of similarity entailed in the two propositions. 20:69. If this is the test, intelligent design completely fails.
Unlike biological systems, human artifacts do not live and reproduce over time. They are non-replicable, they do not undergo genetic recombination, and they are not driven by natural selection. (1:131-33 (Miller); 23:57-59 (Behe)). For human artifacts, we know the designer's identity, human, and the mechanism of design, as we have experience based upon empirical evidence that humans can make such things, as well as many other attributes including the designer's abilities, needs, and desires. (D-251 at 176; 1:131-33 (Miller); 23:63 (Behe); 5:55-58 (Pennock)). With ID, proponents assert that they refuse to propose hypotheses on the designer's identity, do not propose a mechanism, and the designer, he/she/it/they, has never been seen. In that vein, defense expert Professor Minnich agreed that in the case of human artifacts and objects, we know the identity and capacities of the human designer, but we do not know any of those attributes for the designer of biological life. (38:44- 47 (Minnich)). In addition, Professor Behe agreed that for the design of human artifacts, we know the designer and its attributes and	88. Unlike biological systems, human artifacts do not live and reproduce over deep time. They are non-replicable; they don't undergo genetic recombination; and they are not driven by natural selection. 1: 131-33 (Miller); 23:57-59 (Behe). This difference is noted in one of the articles relied upon by Professor Minnich, rejecting the analogy between machines and biological systems, because "[machines are not made of parts that continually turn over, renew. The organism is .... the stability of an organism lies in resilience, the homeostatic capacity to reestablish itself." D251, at 176. 89. For human artifacts, we know the designer's identity (human), the mechanism of design (because we have experience based on empirical evidence that humans can make such things), and many other attributes such as the designer's abilities, needs and desires. *Id.* 1:131-33 (Miller); 23:63 (Behe) 5:5558 (Pennock). With intelligent design, proponents say that they refuse to propose hypotheses on the designer's identity, do not propose a mechanism, and he, she, it (or they) has never been seen. Professor

we have a baseline for human design that does not exist for design of biological systems. (23:61-73 (Behe)). Professor Behe's only response to these seemingly insurmountable points of disanalogy was that the inference still works in science fiction movies. (23:73 (Behe)).	Minnich agreed that in the case of human artifacts and objects we know who the designer is and what the capacities of humans are, but that we don't know any of those attributes for the designer of biological life. 38:44-47. Professor Behe agreed that for human design we know the designer and its attributes (needs, desires, abilities, limitations, materials, technology), 23:61-70; and we have a baseline for human design that does not exist for design of biological systems, 23:70-73. Professor Behe's only response to these insurmountable points of disanalogy was that the inference still works in science fiction movies. 23 :73.
It is readily apparent to the Court that the only attribute of design that biological systems appear to share with human artifacts is their complex appearance, i.e. if it looks complex or designed, it must have been designed. (23:73 (Behe)). This inference to design based upon the appearance of a "purposeful arrangement of parts" is a completely subjective proposition, determined in the eye of each beholder and his/her viewpoint concerning the complexity of a system. Although both Professors Behe and Minnich assert that there is a quantitative aspect to the inference, on cross-examination they admitted that there is no quantitative criteria for determining the degree of complexity or number of parts that bespeak design, rather than a natural process. (23:50 (Behe); 38:59 (Minnich)). As Plaintiffs aptly submit to the Court, throughout the entire trial only one piece of evidence generated by Defendants addressed the strength of the ID inference: the argument is less plausible to those for whom God's existence is in question, and is much less plausible for those who deny God's existence. (P-718 at 705).	90. Ultimately, the only attribute of design that biological systems share with human artifacts is their complex appearance -- if it looks complex or designed, it must have been designed. 23:73 (Behe). Taken to its logical conclusion, this "positive" design argument applies to every complicated thing we see in the universe (tornadoes, the rings of Saturn, the complex ice crystals in snowflakes, etc.), a result whereby natural explanations could be replaced in every instance by "design" arguments. But as Professor Behe conceded about the long discarded geocentric theory, scientific propositions based entirely on appearance can be very wrong. 19:5-6 (Behe); *see also* 16:74 (Padian). 91. This inference to design based on the appearance of a "purposeful arrangement of parts" is a completely subjective proposition, determined in the eye of each beholder. Both Behe and Minnich asserted that there is a quantitative aspect to the inference, but on cross-examination admitted there is no quantitative criteria for determining the degree of complexity or number of parts that bespeak design, rather than a natural process. 23:50 (Behe); 38:59 (Minnich). In fact, in the entire trial there was only one piece of evidence generated by defendants that addressed the strength of the intelligent-design inference: the argument is less plausible to those for whom God's existence is in question, and is much less plausible for those who deny God's existence. Michael 1. Behe, *Reply to My Critics, Biology and Philosophy* 16:685-709,2001. P718, at 705.
Accordingly, the purported positive argument for ID	92. This purported positive argument for intelligent

does not satisfy the ground rules of science which require testable hypotheses based upon natural explanations. (3:101-03 (Miller)). ID is reliant upon forces acting outside of the natural world, forces that we cannot see, replicate, control or test, which have produced changes ***743** in this world. While we take no position on whether such forces exist, they are simply not testable by scientific means and therefore cannot qualify as part of the scientific process or as a scientific theory. (3:101-02 (Miller)).	design does not satisfy the ground rules of science, which require testable hypotheses based on natural explanations. 3: 101-03 (Miller). Intelligent design relies on forces acting outside the natural world, forces that we cannot see, replicate, control or test, which have produced changes in this world. 3:101 (Miller). While such forces may exist, just as it may be true that God arranged the victory of the Red Sox in the World Series, they are not testable by science and, therefore, cannot qualify as part of the scientific process or as a scientific hypothesis or theory. 3: 101-02 (Miller).
It is appropriate at this juncture to address ID's claims against evolution. ID proponents support their assertion that evolutionary theory cannot account for life's complexity by pointing to real gaps in scientific knowledge, which indisputably exist in all scientific theories, but also by misrepresenting well-established scientific propositions. (1:112, 1:122, 1:136-37 (Miller); 16:74-79, 17:45-46 (Padian)).	93. Intelligent design proponents support their argument that evolutionary theory cannot account for life's complexity by pointing not only to real gaps in scientific knowledge - which indisputably exist in all scientific theories - but also by misrepresenting well-established scientific propositions. 1:112,1:122,1:136-37 (Miller); 16:74-79,17:45-46 (Padian))
Before discussing Defendants' claims about evolution, we initially note that an overwhelming number of scientists, as reflected by every scientific association that has spoken on the matter, have rejected the ID proponents' challenge to evolution. Moreover, Plaintiffs' expert in biology, Dr. Miller, a widely-recognized biology professor at Brown University who has written university-level and high-school biology textbooks used prominently throughout the nation, provided unrebutted testimony that evolution, including common descent and natural selection, is "overwhelmingly accepted" by the scientific community and that every major scientific association agrees. (1:94-100 (Miller)). As the court in *Selman* explained, "evolution is more than a *theory* of origin in the context of science. To the contrary, evolution is the dominant *scientific* theory of origin accepted by the majority of scientists." *Selman,* 390 F.Supp.2d at 1309 (emphasis in original). Despite the scientific community's overwhelming support for evolution, Defendants and ID proponents insist that evolution is unsupported by empirical evidence. Plaintiffs'	94. Before discussing defendants' claims about evolution in greater detail, it must be noted that the overwhelming number of scientists, as reflected by every scientific association that has spoken to the matter, have rejected intelligent- design proponents' challenge to evolution. . . . 95. Dr. Kenneth Miller, plaintiffs' expert in biology, explained evolutionary theory. Dr. Miller is a widely-recognized biology professor at Brown University. His research focus is cell-biology. P214 (curriculum vitae). He has written university-level and high-school-biology text books. 1 :40-47. Indeed, his high school text, which was selected for use in Dover, is used by about 35% of the school districts in the nation. 1 :44. He is the former editor of several prominent cell biology journals, 1 :37-38, and serves as the science advisor to the PBS News Hour and formerly as an advisor to the PBS science program NOY A. P214. 96. Dr. Miller explained that evolution is the process of change over time. 1 :70. It consists of

science experts, Drs. Miller and Padian, clearly explained how ID proponents generally and *Pandas* specifically, distort and misrepresent scientific knowledge in making their anti-evolution argument.	three core propositions. The first is that life in the past was different from today, and that it indeed has changed over time. 1 :71. The second is the principle of common descent, which is that living things are united by common ancestry. *Id.* The third is that changes over time and common descent are driven by forces, principles and actions observable in the world today. *Id.* There are actually many forces and processes, but they are typically united under the term "natural selection. *Id* 101. Despite the scientific community's overwhelming support for evolution, defendants and intelligent-design proponents insist that evolution is unsupported by empirical evidence. Plaintiffs' science experts, Drs. Miller and Padian, explained how intelligent-design proponents generally, and *Pandas* specifically, distort and misrepresent scientific knowledge in making the antievolution argument. .
In analyzing such distortion, we turn again to *Pandas,* the book to which students are expressly referred in the disclaimer. Defendants hold out *Pandas* as representative of ID and Plaintiffs' experts agree in that regard. (16:83 (Padian); 1:107-08 (Miller)). A series of arguments against evolutionary theory found in *Pandas* involve paleontology, which studies the life of the past and the fossil record. Plaintiffs' expert Professor Padian was the only testifying expert witness with any expertise in paleontology. [FN15] His testimony therefore remains unrebutted. Dr. Padian's demonstrative slides, prepared on the basis of peer-reviewing scientific literature, illustrate how *Pandas* systematically distorts and misrepresents established, important evolutionary principles.	102. Defendants hold out *Of Pandas and People* as representative of the intelligent-design argument. The statement read to students expressly asserts this point: "Of Pandas and People is available for students who might be interested in gaining an understanding of what intelligent design actually involves." P124, 131. Plaintiffs' experts agreed that *Pandas* is representative of intelligent design. 16:83 (Padian); 1:107-08 (Miller). 103. Many of the arguments against evolutionary theory in *Of Pandas and People* involve paleontology, which studies the life of the past and the fossil record. 16:46-47 (Padian). 104. Professor Kevin Padian was the only testifying expert witness with any expertise in paleontology.... 106. Therefore, Dr. Padian's testimony is uncontested. 107. Through a series of demonstrative slides prepared based on peer-reviewed scientific literature, Dr. Padian showed how *Of Pandas and People* systematically distorts and misrepresents established and important evolutionary principles.

FN15. Moreover, the Court has been presented with no evidence that either Defendants' testifying experts or any other ID proponents, including *Pandas'* authors, have such paleontology expertise as we have been presented with no evidence that they have published peer-reviewed literature or presented such information at scientific conferences on paleontology or the fossil record. (17:15-16 (Padian)).	105. None of defendants' testifying experts have any expertise in paleontology or the fossil record. 17: 16-17 (Padian). Furthermore, there is no evidence that either defendants' testifying experts or any other intelligent-design proponents, including *Pandas'* authors, have such expertise since they have not published peer-reviewed literature or presented at scientific conferences on paleontology or the fossil record. 17: 15-16 (Padian). Professor Behe admitted that he has no basis to vouch for *Pandas'* representation of the fossil record. 21 :44-45.
We will provide several representative examples of this distortion. First, *Pandas* misrepresents the "dominant form of understanding relationships" between organisms, namely, the tree of life, represented by classification determined via the method of cladistics. (16:87-97 (Padian); P-855.6-855.19). Second, *Pandas* misrepresents "homology," the "central concept of comparative biology," that allowed scientists to evaluate comparable parts among organisms for classification purposes for hundreds of years. (17:27-40 (Padian); P-855.83-855.102). Third, *Pandas* fails to ***744** address the well-established biological concept of exaptation, which involves a structure changing function, such as fish fins evolving fingers and bones to become legs for weight-bearing land animals. (16:146-48 (Padian)). Dr. Padian testified that ID proponents fail to address exaptation because they deny that organisms change function, which is a view necessary to support abrupt-appearance. *Id.* Finally, Dr. Padian's unrebutted testimony demonstrates that *Pandas* distorts and misrepresents evidence in the fossil record about pre-Cambrian-era fossils, the evolution of fish to amphibians, the evolution of small carnivorous dinosaurs into birds, the evolution of the mammalian middle ear, and the evolution of whales from land animals. (16:107-17, 16:117-31, 16:131-45, 17:6- 9, 17:17-27 (Padian); P-855.25-855.33, P-855.34-855.45, P-855.46-855.55, P-855.56-866.63, P-855.64-855.82).	107...For instance, *Pandas* misrepresents the "dominant form of understanding relationships" between organisms, namely, the tree of life, represented by *classification* determined via the method of cladistics. 16:87-97; demonstrative P855.6-855.19. *Pandas* also misrepresents *"homology,"* the "central concept of comparative biology," that has for hundreds of years allowed scientists to compare comparable parts among organisms for classification purposes. 17:27-40; P855.83-855.102. And *Pandas* fails to address at all the well established biological concept of *exaptation,* which involves a structure changing function, like fish fins evolving fingers and bones to become legs for weight- bearing land animals, dinosaur forelimbs becoming bird wings, and the front and back legs of primitive hoofed mammals becoming whale flippers and vestigial limbs, respectively. 16: 146-48. Dr. Padian testified that intelligent-design proponents do not address exaptation because they deny that organisms change function, a view necessary to support the abrupt-appearance argument. *Id.* 108. Dr. Padian's unrebutted testimony also demonstrates that *Pandas* distorts and misrepresents evidence in the fossil record about preCambrian-era fossils, 16:107-17; P855.25-855.33 about the evolution offish to amphibians, 16: 117-131; P855.34-855.45, the evolution of small carnivorous dinosaurs into birds, 16:131-45; P855.46-855.55, the evolution of the mammalian middle ear, 17:6-9 (Padian); P855.56-866.63, and the evolution of whales from land animals. 17: 17-27; P855.64-855.82.
In addition to Dr. Padian, Dr. Miller also testified	110. Dr. Miller testified that *Pandas'* treatment of

that *Pandas* presents discredited science. Dr. Miller testified that *Pandas* ' treatment of biochemical similarities between organisms is "inaccurate and downright false" and explained how *Pandas* misrepresents basic molecular biology concepts to advance design theory through a series of demonstrative slides. (1:112 (Miller)). Consider, for example, that he testified as to how *Pandas* misinforms readers on the standard evolutionary relationships between different types of animals, a distortion which Professor Behe, a "critical reviewer" of *Pandas* who wrote a section within the book, affirmed. (1:113-17 (Miller); P-854.9-854.16; 23:35-36 (Behe)). [FN16] In addition, Dr. Miller refuted *Pandas* ' claim that evolution cannot account for new genetic information and pointed to more than three dozen peer-reviewed scientific publications showing the origin of new genetic information by evolutionary processes. (1:133-36 (Miller); P-245). In summary, Dr. Miller testified that *Pandas* misrepresents molecular biology and genetic principles, as well as the current state of scientific knowledge in those areas in order to teach readers that common descent and natural selection are not scientifically sound. (1:139-42 (Miller)).	biochemical similarities between organisms is "inaccurate and downright false." 1: 112 (Miller). He explained, through a series of demonstrative slides based on peerreviewed publications, how *Pandas* misrepresents basic molecular biology concepts to advance the design theory. For example, he testified how *Pandas* misinforms readers on the standard evolutionary relationships between different types of animals, 1: 113-17; P854.9-854.16, a distortion Professor Behe affirmed. 23:35-36. Dr. Miller also refuted *Pandas'* claim that evolution cannot account for new genetic information. Dr. Miller pointed to more than three-dozen peerreviewed-scientific publications showing the origin of new genetic information by evolutionary processes. 1: 133-36; P245. In sum, Dr. Miller testified that *Pandas* misrepresents molecular-biology and genetics principles, and the current state of scientific knowledge in those areas, in order to teach readers that common descent and natural selection are not scientifically sound. 1: 139-42
FN16. Additionally, testimony provided by Professor Behe revealed an increasing gap between his portrayal of ID theory and how it is presented in *Pandas.* Although he is a "critical reviewer" of the work, he disagrees with language provided in the text, including but not limited to the text's very definition of ID. (P-11 at 99-100).	
Accordingly, the one textbook to which the Dover ID Policy directs students contains outdated concepts and badly flawed science, as recognized by even the defense experts in this case.	111. In sum, the one textbook to which the Dover policy directs students contains badly flawed and scientifically refuted science. . . .
A final indicator of how ID has failed to demonstrate scientific warrant is the complete absence of peer-reviewed publications supporting the theory. Expert testimony revealed that the peer review	112 . Yet another measure of how intelligent design has failed to demonstrate scientific warrant is the complete absence of peer-reviewed publications supporting the concept. Peer review is "exquisitely

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<td>process is "exquisitely important" in the scientific process. It is a way for scientists to write up their empirical research and to share the work with fellow experts in the field, opening up the hypotheses to study, testing, and criticism. (1:66-69 (Miller)). In fact, defense expert Professor Behe recognizes the importance of the peer review process and has written that science must "publish or perish." (22:19-25 (Behe)). Peer review helps to ensure that research papers are scientifically accurately, meet the standards of the scientific method, and are relevant to other scientists in the field. (1:39-40 (Miller)). Moreover, peer review involves scientists submitting a manuscript to a scientific journal in the field, journal editors soliciting critical reviews from other experts in the field and deciding whether *745 the scientist has followed proper research procedures, employed up-to-date methods, considered and cited relevant literature and generally, whether the researcher has employed sound science.</td>
<td>important" in the scientific process. 1 :67 (Miller). Peer review is a way for scientists to write up their empirical research and to share the work with fellow experts in the field, opening up the hypotheses to study, testing and criticism. 1 :66-69 (Miller). Peer review helps to ensure that research papers are scientifically accurate, meet the standards of the scientific method, and are relevant.

114. Defendants' expert, Professor Behe, recognizes the importance to science of the peer review process. 22:25. Behe has written that science must "publish or perish." 22: 19-21, citing P647, Michael Behe, Darwin's Black Box, at 185 (1996). Professor Minnich agreed that it is important to publish in peerreviewed journals so scientific peers can evaluate the evidence and conclusions. 38:32. and interesting to other scientists in the field. 1 :39-40 (Miller).

113. Peer review involves scientists submitting a manuscript to a scientific journal in the field. The journal editors will solicit critical reviews from other experts in the field. These experts decide whether the scientist has followed proper research procedures, employed up-to-date methods, considered and cited relevant literature, inferred or speculated more than appropriate, and, generally, whether the researcher has employed sound science.</td>
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<td>The evidence presented in this case demonstrates that ID is not supported by any peer-reviewed research, data or publications. Both Drs. Padian and Forrest testified that recent literature reviews of scientific and medical-electronic databases disclosed no studies supporting a biological concept of ID. (17:42- 43 (Padian); 11:32-33 (Forrest)). On cross-examination, Professor Behe admitted that: "There are no peer reviewed articles by anyone advocating for intelligent design supported by pertinent experiments or calculations which provide detailed rigorous accounts of how intelligent design of any biological system occurred." (22:22-23 (Behe)). Additionally, Professor Behe conceded that there are no peer-reviewed papers supporting his claims that complex molecular systems, like the bacterial flagellum, the blood-clotting cascade, and the immune system, were intelligently designed. (21:61-62 (complex molecular systems), 23:4-5</td>
<td>116. Intelligent design is not supported by any peer-reviewed research, data or publications. Both Doctors Padian and Forrest testified that recent literature reviews of scientific and medical-electronic databases disclosed no studies supporting a biological concept of intelligent design. 17 :42-43 (Padian); 11 :32-33 (Forrest).

117. Professor Behe, under cross examination, admitted that, "There are no peer reviewed articles by anyone advocating for intelligent design supported by pertinent experiments or calculations which provide detailed rigorous accounts of how intelligent design of any biological system occurred." 22:22-23 (Behe). He also acknowledged that there were no peer-reviewed papers supporting his claims that complex molecular systems, like the bacterial flagellum, the bloodclotting cascade and the immune system, were intelligently designed. 21: 61-62 (complex molecular systems),</td>
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(immune system), and 22:124-25 (blood-clotting cascade) (Behe)). In that regard, there are no peer-reviewed articles supporting Professor Behe's argument that certain complex molecular structures are "irreducibly complex." [FN17] (21:62, 22:124-25 (Behe)). In addition to failing to produce papers in peer-reviewed journals, ID also features no scientific research or testing. (28:114-15 (Fuller); 18:22-23, 105-06 (Behe)).	23:4-5 (immune system), and 22:124-25 (blood-clotting cascade). 118. Similarly, there are no peer-reviewed articles supporting Professor Behe's argument that certain complex molecular structures are "irreducibly complex." 21 :62, 22: 124-25.... 119. Besides failing to produce papers in peer-reviewed journals, intelligent design also features no scientific research or testing.
FN17. The one article referenced by both Professors Behe and Minnich as supporting ID is an article written by Behe and Snoke entitled "Simulating evolution by gene duplication of protein features that require multiple amino acid residues." (P-721). A review of the article indicates that it does not mention either irreducible complexity or ID. In fact, Professor Behe admitted that the study which forms the basis for the article did not rule out many known evolutionary mechanisms and that the research actually might support evolutionary pathways if a biologically realistic population size were used. (22:41-45 (Behe); P-756).	118. ...The one article referenced by Professors Behe and Minnich, as supporting intelligent design, Behe and Snoke, *"Simulating evolution by gene duplication of protein features that require multiple amino acid residues"* Protein Science, P72l, does not mention either irreducible complexity or intelligent design. Professor Behe also admitted that this study did not rule out many known evolutionary mechanisms and that the research actually might support evolutionary pathways if a biologically realistic population size were used. 22:41-55; P756.
After this searching and careful review of ID as espoused by its proponents, as elaborated upon in submissions to the Court, and as scrutinized over a six week trial, we find that ID is not science and cannot be adjudged a valid, accepted scientific theory as it has failed to publish in peer-reviewed journals, engage in research and testing, and gain acceptance in the scientific community. ID, as noted, is grounded in theology, not science. Accepting for the sake of argument its proponents', as well as Defendants' argument that to introduce ID to students will encourage critical thinking, it still has utterly no place in a science curriculum. Moreover, ID's backers have sought to avoid the scientific scrutiny which we have now determined that it cannot withstand by advocating that the *controversy,* but not ID itself, should be taught in science class. This tactic is at best disingenuous, and at worst a canard. The goal of the IDM is not to encourage critical thought, but to foment a revolution which would supplant evolutionary theory with ID.	

To conclude and reiterate, we express no opinion on the ultimate veracity of ID as a supernatural explanation. However, we commend to the attention of those who are inclined to superficially consider ID to be a true "scientific" alternative to evolution without a true understanding of the concept the foregoing detailed analysis. It is our view that a reasonable, objective observer would, after reviewing both the voluminous record in this case, and our narrative, reach the inescapable conclusion ***746** that ID is an interesting theological argument, but that it is not science.	

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[1] Michael Behe, Testimony Transcript 19 (*Kitzmiller v. Dover*, Oct. 19, 2005) (emphasis added).

[2] Scott Minnich, Testimony Transcript 34 (*Kitzmiller v. Dover*, morning session, Nov. 4, 2005).

[3] Stephen Meyer, "The Origin of Biological Information and the Higher Taxonomic Categories" *Proceedings of the Biological Society of Washington* 117(2004):213-239, at http://www.discovery.org/scripts/viewDB/index.php?command=view&id=2177&program=CSC - Scientific Research and Scholarship - Science (accessed Nov. 27, 2006).

[4] Brief of Amicus Curiae Foundation for Thought and Ethics, at appendix D 8-18, at http://www.discovery.org/scripts/viewDB/filesDB-download.php?command=download&id=648 (accessed Nov. 27, 2006).

[5] Scott Minnich, Testimony Transcript 107-108 (*Kitzmiller v. Dover*, afternoon session, Nov. 3, 2005).

[6] Scott Minnich, Testimony Transcript 45-46 (*Kitzmiller v. Dover*, afternoon session, Nov. 3, 2005); Michael Behe, Testimony Transcript 86 (*Kitzmiller v. Dover*, morning session, Oct. 17, 2005).

[7] Brief (Revised) of Amicus Curiae The Discovery Institute at 22-25, appendix A at 1-15 at http://www.discovery.org/scripts/viewDB/filesDB-download.php?command=download&id=646 and http://www.discovery.org/scripts/viewDB/filesDB-download.php?command=download&id=647 (accessed Nov. 27, 2006).

[8] Percival Davis and Dean Kenyon, Of *Pandas and People: The Central Question of Biological Origins* 126-127 (Dallas: Haughton Publishing Co., 2nd ed., 1993).

[9] *Ibid*. at 161.

[10] Scott Minnich, Testimony Transcript 45-46 (*Kitzmiller v. Dover*, afternoon session, Nov. 3, 2005).

[11] Michael Behe, Testimony Transcript 66-68 (*Kitzmiller v. Dover*, morning session, Oct. 19, 2005).

[12] Michael Behe, *Darwin's Black Box* 40, 65-67, 96 (Free Press, 1996).

[13] Scott Minnich, Testimony Transcript 102, 112 (*Kitzmiller v. Dover*, afternoon session, Nov. 3, 2005).